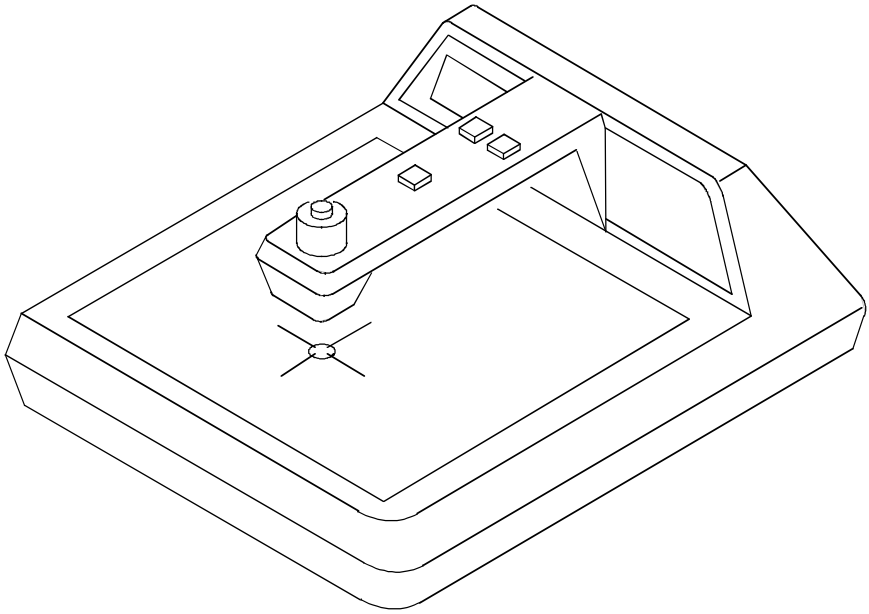
361T

B/W TRANSMISSION
DENSITOMETER



Operation Manual

x-rite

Federal Communications Commission Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTE: Shielded interface cables must be used in order to maintain compliance with the desired FCC and European emission requirements.

Industry Canada Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

AVERTISSEMENT : Des câbles d'interface blindés doivent être utilisés afin de se conformer aux règlements européens et FCC (USA) sur l'émission.

CE DECLARATION

Manufacturer's Name:	X-Rite, Incorporated
Manufacturer's Address:	X-Rite, Incorporated Siemensstraße 12b 63263 Neu-Isenburg • Germany Phone: +49 (0) 61 02-79 57-0 Fax: +49 (0) 61 02 -79 57-57
Model Name:	Densitometer
Model No.:	361
Directive(s) Conformance:	EMC 89/336/EEC LVD 73/23/EEC

RoHS/WEEE

X-Rite products meet the **R**estriction **o**f **H**azardous **S**ubstances (RoHS) Directive 2002/95/EC and European Union – **W**aste **E**lectrical and **E**lectronic **E**quipment (WEEE) Directive 2002/96/EC. Please refer to www.xrite.com for more information on X-Rite's compliance with the RoHS/WEEE directives.

CAUTION: To prevent electrical shock. DO NOT remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

ADVERTENCIA: Para evitar un choque eléctrico, NO QUITE el recubrimiento del aparato. No hay ninguno componente reparable de usuario, dentro del aparato. Consulte un técnico calificado para servicio o arreglo.

AVVERTIMENTO: Per evitare una scossa elettrica, non staccare la coperta del apparecchio. C'è nessuno componenti riparabili d'utente, interno del apparecchio. Consultare un tecnico qualificato per servizio o manutenzione.

VORSICHT: Diese Abdeckung darf nicht entfernt werden. Sie schützt vor elektrischem Schock. Sie deckt auch keine vom Benutzer zu wartenden Teile ab. Mit notwendigen Wartungen wenden Sie sich bitte nur an autorisiertes Fachpersonal.

ATTENTION: Pour prévenir un choc électrique, ne pas enlever le couvercle. Aucune pièce se trouvant á l'intérieur n'est réparable par l'utilisateur. Toute réparation doit être adressée à du personnel compétent.

CAUTION: For continued protection against risk of fire, replace only with same type Time Delay fuse.

ADVERTENCIA: Para evitar el peligro de incendio en el caso de funcionamiento defectuoso del fusible de retrasar, es preciso reemplazarlo con un fusible del mismo tipo

AVVERTIMENTO: Per evitare il pericolo di un incendio nel caso di funzionamento difettoso del fusibile di ritardare, rimpiazzarlo solamente con un fusibile dello stesso tipo.

VORSICHT: Für fortgesetzten Schutz gegen Feuer, ersetzen Sie die Verzögerungssicherung nur mit einer vom gleichen Typ.

ATTENTION: Pour éviter les risques d'incendie, ne remplacer le fusible à retard qu'avec un fusible du même type.

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Proprietary Notice

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This instrument may be covered by one or more patents. Refer to the instrument for actual patent numbers.

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This warranty shall be voided by any repair, alteration, or modification, by persons other than employees of X-Rite, or those expressly authorized by X-Rite to perform repairs, and by any abuse, misuse, or neglect of the product, or by use not in accordance with X-Rite’s published instructions.

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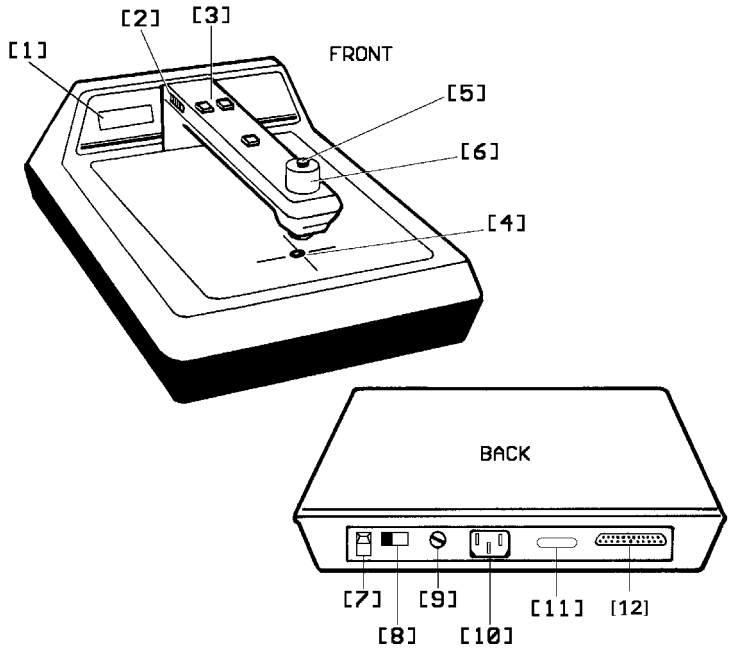
This agreement shall be interpreted in accordance with the laws of the State of Michigan and jurisdiction and venue shall lie with the courts of Michigan as selected by X-Rite, Incorporated.

Overview and Setup

Instrument Description

The X-Rite 361T is a B/W Transmission densitometer designed to meet the quality control needs of the Graphic Arts industry. Your 361T has been integrated with components from the leading edges of technology, which X-Rite has been internationally recognized for.

[**1**] **DISPLAY** - is an 8-character Liquid Crystal Display.



[**2**] **DISPLAY CONTRAST ADJUSTMENT** - allows you to adjust the display to the desired contrast.

[**3**] **KEYBOARD** - consists of three keys that are used for selecting functions, color, and zeroing operation.

[**4**] **APERTURE** - is the area where you center your film.

[**5**] **READ BUTTON** - used to lower the Read Head when taking readings.

[**6**] **READ HEAD** - is the component that contains the optics which comes in contact with your film when taking measurements.

[**7**] **POWER SWITCH** - turns the unit ON (1) and OFF (0).

[**8**] **VOLTAGE SELECTION SWITCH** - selects 115V or 230V operation.

[**9**] **FUSE HOLDER** - holds the proper fuse.

[**10**] **POWER INPUT** - is where the 115V/230V AC line cord plugs in.

[**11**] **REFLECTION HEAD INPUT** - is used to connect optional Reflection Head (see "Optional Equipment" in Chapter 8).

[**12**] **I/O PORT** - is used for RS232 bi-directional serial communications.

Features

Electronic Filter Selection - eliminates the problems that mechanical filter wheels create.

Large Liquid Crystal Display and Electroluminescent Backlighting - allows optimum legibility.

Larger and Fewer Keys - which have been functionally placed for ease of operation and to cut down operator confusion.

Sequence - allows for a setup of a measurement routine to meet the job requirements. Once a sequence structure has been setup, the 361T will automatically select the function for each step, then advance to the next step, step by step. (A maximum of 36 steps) x10 provides an extra digit of display when extreme resolution is required.

RS232 Interface & RCI - (Remote Control Interface) provides a two-way interface for use with computerized quality control systems and electronic printers.

Lamp Timer - if enabled, automatically turns OFF Reading lamp after 2 hours of instrument non-use. This will extend the life expectancy of the read lamp.

Ortho and UV - responses allow measurements on a broad range of films.

Density - provides density and density difference measurements.

+Dot - allows positive dot measurements with zeroing to a Base Dot. +Dot can be calculated for a Base equal to 0% Dot or can be adjusted to a value equal to a known Dot size (ex. 3%).

−Dot allows negative dot measurements with zeroing to a Base Dot. −Dot can be calculated for a Base equal to 100% Dot or can be adjusted to a value equal to a known Dot size (ex. 97%).

Unpack and Inspect

After removing the instrument from the shipping carton, inspect it for damage. If any damage has occurred during shipping, immediately contact the transportation company. Do not proceed with installation until the carrier's agent has inspected the damage.

Your instrument was packaged in a specially designed carton to assure against damage. If shipment is necessary, the instrument should be packaged in the original carton. If the original carton is not available, contact X-Rite to have a replacement carton shipped to you.

Apply Power and Display Angle Adjustment

NOTE: If the unit has been stored in an abnormal (cold) environment, DO NOT apply power to the unit until it has sat for several hours in a normal environment (10-30°C / 50-86°F).

CAUTION: For safety and unit stability, do not modify line cord provided with this instrument. Connect to a grounded 3-wire receptacle.

1. Ensure that the proper operating line voltage is selected (slide switch to 115 V or 230 V as necessary). Plug the female end of the Power Cord into the back of the 361T, and the other end into the wall outlet.

NOTE: When voltage setting is changed, the proper fuse, fuse carrier, and line cord must be used. 115 VAC [Fuse SE24-0060, Fuse Carrier SE71-05, Cord SD33-07] or 230 VAC [Fuse SE49-0030, Fuse Carrier SE71-06, Cord SD33-08]

2. Set the Display Angle Adjustment to a midway setting.
3. Set the power switch to "1" (ON). Adjust the Display Angle until the data in the display can best be seen at your line of sight.
4. Upon power up, the unit will display the software date code. Next, the unit will perform a self-test, and if everything is ok, "TST Pass" will be displayed.

NOTE: If the unit does not pass the self-test, an error message will be displayed, indicating the probable cause (Refer to "Display Messages" in Chapter 2).

5. After the unit passes the self-test, the unit will automatically return to the last function performed (ex. DEN, +DOT, -DOT).

Display (EL) Backlighting

This feature backlights the display for use in reduced room lighting. The Electroluminescent (EL) Backlighting turns OFF after 10 minutes of instrument non-use, and turns back ON when a measurement is taken or any key is depressed.

User Interface

Key Description

The Keyboard consists of three key switches, the [**FUNCTION**] ▼ key, the [**COLOR**] ▲ key, and the [**ZERO**] ▼▲ key.

▼

FUNCTION

- Selects Density, +Dot, and −Dot.

> **NOTE**: Sequence function is disabled from the factory, and will not be displayed during function selection. If you want Sequence enabled refer to "Setting the Sequence Structure" in Chapter 5.

- Decreases numeric values when used with [**ZERO**] key.
- Depressed together with [**COLOR**] to enter Calibration or Modes.

▲

COLOR

- Selects either Ortho or UV Filters during normal operation.
- Increases numeric values when used with [**ZERO**] key.
- Depressed together with [**FUNCTION**] to enter Calibration or Modes.

▼ ▲

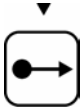
ZERO

- Zeros density or Dot during a measurement.
- Used in conjunction with [**FUNCTION**] or [**COLOR**] to numerically enter a value.

> **NOTE**: If you get lost while selecting functions or don't know exactly where you are during a certain procedure. PRESS THE [**FUNCTION**] KEY as many times as it takes until you get back to a main level function (Den, +Dot, or −Dot).

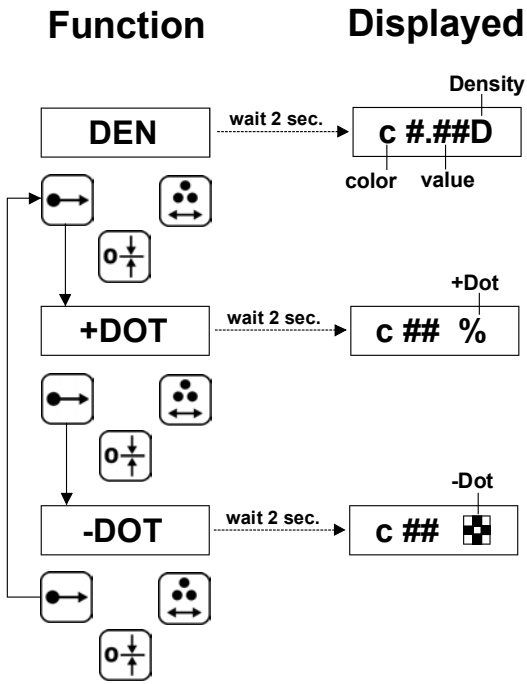
DISPLAY CONTRAST

- Rotate the wheel to the back (+) to increase contrast or to the front (-) to decrease contrast.



Function Selection

The [**FUNCTION**] key normally selects between one of three functions; DEN, +DOT, or -DOT. They are sequentially selected with each momentary depression of the [**FUNCTION**] key. Once the function you want is displayed, wait for the 361T to automatically drop into the function selected (approximately a 2 second waiting period). At this point, the previous measurement is displayed.



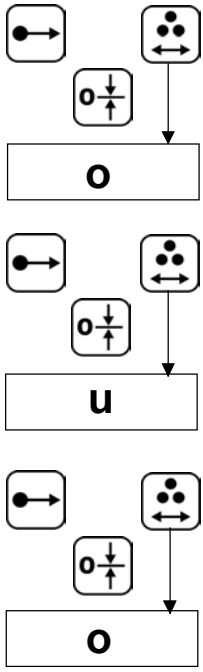
If the Sequence Function is activated (see "Setting the Sequence Structure" in Chapter 5), SEQUENCE will be displayed between -DOT and DEN.

NOTE: If DEN is the only function that can be activated, refer to "311 Emulation" to turn it Off.

Color Selection

The [**COLOR**] Key selects one of two colors, Ortho or UV. They are alternately selected with each depression of the [**COLOR**] key. "o" is displayed for Ortho and "u" for Ultraviolet.

Each depression of the [**COLOR**] key will alternately display "o" (Ortho) or "u" (Ultraviolet).



Reference and Base Entry

Reference values are values, which are subtracted from each density measurement to display a density difference value. Base values are values, which cause +Dot or −Dot to display a predetermined Dot size when zeroed to a base dot or film base fog.

Density Reference Entry Via Keyboard

1. Depress [**FUNCTION**] key repeatedly [**FUNCTION**] until "DEN" is displayed.
2. Select color by depressing the [**COLOR**] key.
3. Hold [**ZERO**] down (thru step 4).
    - "REF" is displayed.
    - Reference value is displayed.
4. Enter Ref value using the [**FUNCTION**] key to decrease value or [**COLOR**] key to increase value. (Depress both to reset to zero.) Release keys.
5. Depress [**FUNCTION**] to return to normal operation.

Density Reference Entry Via Measurement

Momentarily depress [**ZERO**] while measuring area to be Zeroed (Nulled) out.

1. Repeatedly depress [**FUNCTION**] until "DEN" is displayed.
2. Select color by depressing [**COLOR**].
3. Measure the density to be zeroed, and keep the [**READ**] button depressed (thru Step 4).
    - "Density value of density being measured" is displayed.
4. Press [**ZERO**] key.
    - "Zero density" is displayed.
5. Release the [**READ**] button and [**ZERO**] key.

Base Entry

The Base value is usually set to 0% for +DOT and 100% for -DOT, or adjusted to a value equal to a known minimum (base) dot size (ex. 3% for +Dot or 97% for −Dot).

1. Repeatedly depress [**FUNCTION**] key until "+Dot" or "−Dot" is displayed.
2. Select color by depressing [**COLOR**].
3. Hold [**ZERO**] key down (thru step 4).
    - Base value is displayed.
4. Enter Base value using the [**FUNCTION**] key to decrease or the [**COLOR**] key to increase value. (depress both to reset to zero.) Release keys.
5. Depress [**FUNCTION**] to return to normal operation.

Measurement Procedure - General

1. Select desired function and color.
2. Center area being measured over center of aperture.
3. Lower reading head by pressing on Read button. "READING" will be displayed during a measurement cycle.
4. Release Read Button after data is displayed.

> **NOTE**: "**INVALID**" will be displayed if the Read button is not depressed for enough time.

Display Messages

MESSAGE	REASON
BATTERY:	The memory backup battery has failed. The Lithium battery needs replacement by a qualified technician.
INVALID:	The Read button was held down too short causing an invalid measurement. If "**INVALID**" appears after the Read button was held down for the proper length of time or if "**READING**" is displayed an abnormal length of time while taking a measurement, possible causes are defective Side Sensor, Reading Head Assembly, or Transmission PCB.
LAMP FAIL:	The Read Lamp has failed its intensity test. The Read Lamp should be examined and possibly replaced. When this happens, you can get out of this error.

MESSAGE	REASON
	condition (if lamp was OK or replaced) by pressing [**FUNCTION**], then [**COLOR**], then [**FUNCTION**].
MEM TEST:	The memory in the unit is going through an extended memory check. If "**MEM TEST**" remains on the display, the display PCB needs to be replaced.
MEM LOST:	Calibration of the unit has been lost and recalibration is necessary.
NEED CAL:	Unit needs full length calibration.
uP FAIL:	The microprocessor has failed its memory test. The display PCB should be replaced by a qualified technician.

311 Emulation

When 311 EMULATION is set to ON, the 361T will simulate the I/O port and some operational characteristics of the X-Rite 311/RS densitometer. The modes are setup as follows: x10 OFF, I/O Port [RCI ON, RPT OFF, P5 OFF, BAUD 1200, HDR OFF, DPT OFF, CR, COMP OFF, and X OFF], SEQUENCE OFF, and READ LAMP ON. The operational characteristics are setup as follows: DENSITY operation is the only function that is accessible, and MODES are disabled.

> **NOTE**: **To access 311 emulation, the AC power must be turned off and then turned back on with the function and color keys held depressed thru the self test until "311 off" is displayed.**

Described below is the procedure for setting the 311 Emulation.

1. Turn OFF power to the 361T.
2. Depress [**FUNCTION**] and [**COLOR**] keys together (than turn on A.C Power) until "311 OFF" is displayed.
3. Each depression of the [**ZERO**] key will alternate between 311 ON and 311 OFF.
4. Depress [**FUNCTION**] one time to return to normal operation.

Measurement Procedures

Density Function

The DEN function allows you to take density and density difference measurements. The procedure for each of these are as follow.

DENSITY MEASUREMENT

1. Repeatedly depress [**FUNCTION**] key until "**DEN**" is displayed. Previous density is displayed.
2. Select color (ortho or ultraviolet).
3. Measure film. Density value is displayed.

DENSITY DIFFERENCE MEASUREMENT

1. Repeatedly depress [**FUNCTION**] key until "DEN" is displayed. Previous density is displayed.
2. Select color (ortho or ultraviolet).
3. Enter a reference value. Refer to "Reference and Base Entry" in Chapter 2 for entry of reference via the keyboard, or via a measurement.
4. Measure film that is to be compared. Density difference value is displayed.

+DOT Function

The +DOT function allows positive dot measurements with zeroing to a Base Dot value. +Dot can be calculated for a Base equal to 0% Dot or can be adjusted to a value equal to a known Dot size (ex. 3%). +DOT is normally used for positive films.

+DOT MEASUREMENT

1. Repeatedly depress [**FUNCTION**] until "**+DOT**" is displayed. Previous Dot value is displayed.
2. Select color (ortho or ultraviolet).
3. Zero unit to a Base Dot or Base Fog of film, by pressing [**ZERO**] while measuring this area of the film.
4. Measure the Dot area on the film. +Dot value is displayed.

-DOT Function

−Dot allows negative dot measurements with zeroing to the Base Dot value. −Dot can be calculated for a Base equal to 100% or can be adjusted to a value equal to a known Dot size (ex. 97%). -DOT is normally used for negative films.

-DOT MEASUREMENT

1. Repeatedly depress the [**FUNCTION**] key until "-DOT" is displayed. Previous Dot value is displayed.
2. Select color (ortho or ultraviolet).
3. Zero unit to a Base Dot or Base Fog of film, by pressing [**ZERO**] while measuring this area of the film.
4. Measure the film. −Dot value is displayed. Repeatedly depress [**FUNCTION**] until "**+DOT**" is displayed. Previous Dot value is displayed.

Sequence (Disabled from factory)

The Sequence function allows a setup of a measurement sequence to meet the job requirements. Once a sequence structure has been setup (see "Setting the Sequence Structure" in Chapter 5 for setup procedure) the 361T will automatically select the function and advance to the next step, step by step. Once in the Sequence function, a depression of the Read button advances to the next step. However, the 361T can increment or decrement thru the steps by depressing and holding ▼▲ [**ZERO**] key and then depressing ▼ [**FUNCTION**] key to decrement or ▲ [**COLOR**] key to increment.

IMPORTANT! The Density/Dot value for each sequence step is displayed during the measurement (Read button depressed). When the Read button is released, the display shows the next step to measure. If you desire to view the Density/Dot value for the last step measured, press the [**ZERO**] key to view it, and then press [**ZERO**] again to return.

NOTE: During sequence operation, look at the display and make sure each measurement is correct before releasing the Read button to proceed to the next step.

The example Sequence procedure below shows a sequence that was setup using two steps, and it starts out at step1. When entering sequence, the function will always start at the lowest step enabled.

1. Repeatedly depress the [**FUNCTION**] key until "**SEQUENCE**" is displayed. (If sequence does not appear, refer to "Setting the Sequence Structure" in Chapter 5). Function, Color, and Step to be measured first is displayed.
2. Select color (ortho or ultraviolet).
3. Take first measurement.
4. Measurement value and Step number are displayed while the [**READ**] button is held down. After Read button is released, Step 2 is displayed.
5. Take second measurement.
6. Measurement value and step number are displayed while the read button is held down.
   * After release of the Read button, the display will ask if you want to print out. If yes, press [**COLOR**]. If no, press [**ZERO**] or [**FUNCTION**].

> **NOTE**:
>
> 1) "**PRINT? C**" will only be displayed if the Sequence printout procedure in Mode Setup is selected for CLASS or ORDER. It will automatically print out after each measurement (step) if EACH was selected. (See "Setting the Sequence Structure" in Chapter 5.)
>
> 2) When Step 00 is setup for "**ZERO 00**" the unit will use the same Zero (reference) value for Den, +Dot, or −Dot.
>
> 3) The Zero (reference) value is common to all Density steps, all +Dot steps, and/or all −Dot steps, for step zero (00) only. On any other step, if the unit is zeroed, the zeroing only applies for the function that was selected for that step.

Calibration

General Information

The X-Rite 361T is designed for long life and extremely stable measurements. To follow good quality control practice, you should check Density and Dot calibration periodically to verify measurement accuracy and proper operation of your unit. To verify and perform Density calibration, a calibrated transmission reference has been provided. The transmission reference has a five step gray scale ranging from approximately 0.06D (step 1) to 4.0D (step 5).

Frequency of Calibration

Under normal operating conditions, the instrument should be calibrated once a week or when instrument displays a message regarding calibration.

Density Calibration Check

To check density calibration, first zero the unit, and then measure the "cal" step on the transmission reference. If the measurement is within .02D of the densities specified, the unit is properly calibrated. If not, the unit must be recalibrated (see "Density Calibration Procedure" in Chapter 4).

> **NOTE**: On the transmission reference, step 4 (CAL) is used for calibration, and steps 1, 2, 3, and 5 are used for checking the linearity of the unit.

Density Calibration Procedure

Handle the transmission reference at the edges only. Fingerprints or any other foreign substances on the measurement area will cause errors. Attempts to dust or clean the surface with anything other than a soft camel hair brush may change densities. Minimize change by storing in a dark, cool, dry place.

1. Depress [**FUNCTION**] and [**COLOR**] keys at the same time until "N Dcal Y" is displayed.
2. Depress [**ZERO**] for YES.
3. Depress [**FUNCTION**] for NO.
4. Calibration Hi value for Ortho is displayed. (If value is correct skip to Step 6.)

5. Enter the correct Cal Hi value for Ortho (as marked on the step tablet) by pressing and holding ▼▲ (**ZERO**) down and using the ▼ (**FUNCTION**) key to decrease value or the ▲ (**COLOR**) key to increase value. Then release both keys.
6. Depress [**COLOR**] key to select Ultraviolet cal value. Cal Hi value is displayed for Ultraviolet. (If value is correct skip to Step 8.)
7. Enter the correct Cal Hi value for Ultraviolet (as marked on the step tablet) by depressing and holding ▼▲ (**ZERO**) down and using the ▼ (**FUNCTION**) key to decrease value or the ▲ (**COLOR**) key to increase value. Then release both keys.
8. Depress [**COLOR**] key.
9. Remove all film from table and take measurement. "**Cal LO**" value is displayed during measurement.
10. Release Read button.
11. Take measurement of Cal Step on the Step tablet. "**CAL HI**" value is displayed during measurement. Display automatically returns back to "**DEN**" upon release of the Read button.

Dot Area Calibration Procedure

NOTE: This calibration procedure only pertains to units with software date code 8718 and greater. The dot area calibration will allow for more accurate dot area measurements. When calibrating dot area it is important that a dot reference with a true 50% dot area (i.e. UGRA Plate Control Wedge, RIT Microline Resolution Target, etc.) is used for proper calibration. Shown below is the procedure for Dot Area calibration. Density calibration needs to be performed or verified first.

1. Depress [**FUNCTION**] and [**COLOR**] keys at the same time until "N Dcal Y" is displayed.
2. Press [**FUNCTION**] to indicate No, you do not want to calibrate density.
3. Press [**ZERO**] to indicate Yes, you want to calibrate dot area.
4. Press [**COLOR**] key to select color (ortho or ultraviolet).
5. Measure base area on the film. After releasing Read button, "**READ 50%**" is displayed.
6. Measure 50% dot on the film. After releasing Read button, display returns to normal +Dot operation.

N-Factor Adjustment Procedure

NOTE: Transmission dot "N-factor" is calibrated at the factory and therefore should not require user calibration.

However, if calibration to a particular 50% dot reference is desired, it is important that a reference with a true 50% dot area (e.g.; UGRA Plate Control Wedge, RIT Microline Resolution Target, etc.) is used. Enter the factory preset N-factors for ortho and u.v. below for future reference.

ortho N-factor_____ u.v. N-factor_____

The N-factor for dot can be adjusted by performing the following procedure.

1. Press the [**FUNCTION**] and [**COLOR**] keys simultaneously until "**N Dcal Y**" displays.
2. Press the [**FUNCTION**] key to bypass Density Calibration procedure.
3. Press the [**ZERO**] key to enter Dot Calibration procedure.
4. Select ortho (o) or ultraviolet (u) by pressing the [**COLOR**] key.
5. Measure base area on film. "**READING**" is displayed followed by "**0%**" dot value. After the Read button is released, "**Read 50%**" is displayed.
6. Press the [**COLOR**] key to enter N-Factor menu.
7. Press the [**COLOR**] key to toggle between ortho (o) or ultraviolet (u), if required.
8. Adjust the N-Factor by pressing and holding the [**ZERO**] key. Repeatedly press the ▲ (**COLOR**) key to increase value or the ▼ (**FUNCTION**) key to decrease value.
9. After adjustments, press the [**FUNCTION**] key to exit N-factor.

Quick CAL™ Procedure

Quick Cal™ provides you with an easy means of re-establishing zero (Calibration Low). This method is included because the zero (Calibration Low) is the major factor of drift over a period of time.

1. Depress [**FUNCTION**] and [**COLOR**] keys at the same time until "**N Dcal Y**" is displayed.
2. Depress [**ZERO**] for YES.
3. Depress [**ZERO**] for YES.
4. Remove all film from table, and take a measurement.
5. Release the Read button, display will automatically return back to DEN.

Mode Selection

General Information

The Mode function controls four factors: x10 On/Off, I/O Port set-up, Sequence setup, and Read Lamp On/Off. Modes come preset from the factory as follows:

1. x10 [OFF]

2. I/O PORT
   - RCI [ON]
   - RPT [OFF]
   - P5 [OFF]
   - BAUD [1200]
   - HRD [OFF]
   - DPT [ON]
   - COMP [ON]
   - CR [LF]

3. SEQUENCE
   - SQ [OFF]
   - COL [ADJ]
   - SQ [ORDER]
   - SIZE [36]
   - SKIP [00] (Skip Step 0)
   - FUNCTION STEP [all set to DEN]

4. READ LAMP [ON]

To change any of the above settings refer to the setup procedures in Chapter 5 which follow: x10 On/Off, I/O Port Setting, Sequence Structure, and Read Lamp.

> **NOTE**: If no Modes can be accessed in Mode Selection, refer to "311 Emulation" in Chapter 2 to turn Off 311 Emulation.

x10 ON/OFF

When activated, the x10 function allows an extra digit to be displayed when extreme resolution is required.

1. Depress [**FUNCTION**] and [**COLOR**] keys at the same time until "**N Dcal Y**" is displayed.
2. Depress [**FUNCTION**] for NO.
3. Depress [**FUNCTION**] for NO.
4. Depress [**ZERO**] for YES.
5. Depress [**ZERO**] to turn x10 ON or OFF.
6. Press [**FUNCTION**] four (4) times to return to normal operation.

I/O Port Selection

Your X-Rite 361T comes equipped with a serial port that allows data to be transmitted and/or received by the 361T to/from an external device. The 361T can be externally controlled by the Serial Input Commands discussed in "Serial Input Commands" in Chapter 6.

- **RCI** [Remote Control Input] enables or disables the ability to externally control the 361T via the I/O port.
- **RPT ON/OFF** [Reference Print] enables or disables the Reference values during print-out.
- **P5** determines the status of Pin 5 of the I/O port. Pin 5 may be set to OFF, BUSY, or CTS (Clear To Send). Note: Pin 5 should normally be set to OFF when Pin 5 is not going to be used.
- **BAUD RATE** determines the output rate (characters per second) of the I/O port. Available outputs are: 300, 600, 1200, 2400, 4800, 9600, and OFF.
- **HDR** [Header] enables or disables the header (DEN, +DOT, -DOT, TRANS, and x10) during print-out. When set to ON, the header will print. When set to OFF, the header will not print.
- **DPT** [Decimal Point] enables or disables the decimal point during print-out. When set to ON, the decimal point will print. When set to OFF, the decimal point will not print.
- **CR / CR LF** [Carriage Return / Carriage Return, Line Feed] varies the delimiter at the end of each line of data. When set to CR, just a Carriage Return is sent at the end of a line of data. When set to CR LF, a Carriage Return and a Line Feed are sent at the end of a line of data.
- **COMP** [Computer output] varies the output format of the I/O port. When set to ON, a Space will appear after each group of data values. When set to OFF, no space will appear after each group of data values.

> **NOTE**: <SP>=Space, <CR>=Carriage Return, and <LF>=Line Feed

- **X ON / X OFF** - not available at this time.

The procedure for setting the I/O port options is shown below.

1. Depress [**FUNCTION**] and [**COLOR**] keys at the same time until "**N Dcal Y**" is displayed.
2. Depress [**FUNCTION**] for NO.
3. Depress [**FUNCTION**] for NO.
4. Depress [**ZERO**] for YES.
5. Depress [**FUNCTION**], "↓ I/O Y" is displayed.
6. Press [**ZERO**] to advance to RCI. Each depression of the [**ZERO**] key will alternate between RCI OFF and RCI ON.
7. Press [**FUNCTION**] to advance to FUNCTION RPT. Each depression of [**ZERO**] key will alternate between RPT ON and RPT OFF.
8. Press [**FUNCTION**] to advance to P5. Each depression of [**ZERO**] key will select between P5: Busy, CTS, or OFF.
9. Press [**FUNCTION**] to advance to BAUD. Each depression of [**ZERO**] will page thru BAUD 2400, 4800, 9600, OFF, 300, 600, and 1200.
10. Press [**FUNCTION**] to advance to FUNCTION HDR. Each depression of [**ZERO**] key will alternate between HDR ON and HDR OFF.
11. Press [**FUNCTION**] to advance to FUNCTION DPT. Each depression of [**ZERO**] key will alternate between DPT OFF and DPT ON.
12. Press [**FUNCTION**] to advance to FUNCTION COMP. Each depression of [**ZERO**] key will alternate between COMP OFF and COMP ON.
13. Press [**FUNCTION**] to advance to FUNCTION CR. Each depression of [**ZERO**] key will alternate between CR LF and CR.
14. Press [**FUNCTION**] four (4) times and the 361T returns to normal operation.

Setting the Sequence Structure

Sequence allows you to setup a measurement routine that fits your individual quality control requirements. Sequence has a maximum of 36 steps and a function for each step can be selected.

- **SQ OFF/ON** is used to disable or enable SEQUENCE from appearing as an active function in the main menu.
- **COL ADJ/LOC** is used to allow ADJustment of what color response is used during sequence or to LOCk sequence into one response only.
- **SQ order/class/each** is used to determine the method for printout of data.
    1. order – Transmit all data by sequential step number.
    2. class – Transmit data by type of function. (i.e. DEN first, then +Dot, then −Dot)
    3. each – Transmit data after each step is measured.
- **SIZE 1-36** sets the size of the sequence from 1 to 36 steps.
- **FUNCTION Den/+Dot/−Dot/Skip** sets the function that will be used for each sequence step.

> **NOTE:** SKIP is used for steps that you don't want to measure, but you still want the step number (during measurement and print out) to correlate to the actual step numbers of the film. The steps you set as SKIP will not be displayed during Sequence operation; instead the display will skip over them and designate the actual step you are support to read. For example, if you set steps 2 and 5 as SKIP, your 361T will display step 1, 3, 4, 6, 7, etc. as you advance thru sequence.

The procedure for setting Sequence structure is shown below.

1. Depress [**FUNCTION**] and [**COLOR**] keys at the same time until "**N DcalY**" is displayed.
2. Depress [**FUNCTION**] for NO.
3. Depress [**FUNCTION**] for NO.
4. Depress [**ZERO**] for Yes.
5. Depress [**FUNCTION**] two (2) times "**↓ SEQ Y**" is displayed.
6. Depress [**ZERO**] to advance to SQ. Each depression of [**ZERO**] will alternate between SQOFF and SQ On.

   NOTE: If "←SQ OFF" is displayed, depressing the FUNCTION key will cause the display to return to Step 4.
7. Depress [**FUNCTION**] to advance to COL. Each depression of [**ZERO**] will alternate between COL LOC and COL ADJ.
8. Depress [**FUNCTION**] to advance to SQ. Each depression of [**ZERO**] will page thru SQ class, SQ each, SQ order.
9. Depress [**FUNCTION**] to advance to SIZE. Hold **▼▲ (ZERO)** pressed down and press **▼ (FUNCTION)** to decrease or **▲ (COLOR)** to increase the amount of steps required (1 thru 36).
10. Depress [**FUNCTION**] to advance to DEN 00 (Step 00).
11. Repeatedly press the [**COLOR**] key until "←SKIP 00" is displayed. (This will cause Step 00 to be skipped during operation.) Or select **[←ZERO 00]** to enable a special step 0 for zeroing the densitometer to the film base.
12. Hold **▼▲ (ZERO)** pressed down and press **▲ (COLOR)** once to advance to Step 1. Release keys.
13. Repeatedly press [**COLOR**] key to select the function (DEN, +DOT, -DOT, or SKIP) that will be required for the step.
14. Hold **▼▲ (ZERO)** pressed down and press **▲ (COLOR)** once to advance to Steps 2, 3, 4, etc.
15. Depress [**FUNCTION**] three (3) times and 361T returns to normal operation.

Read Lamp ON/OFF

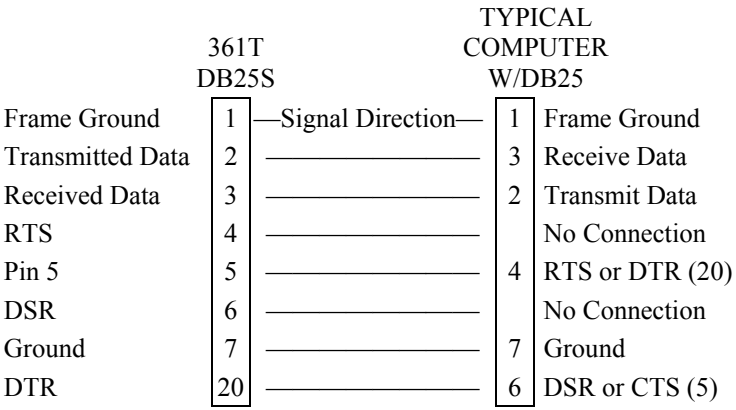
This feature allows the densitometer to automatically turn the Read lamp OFF after 2 hours of instrument non-use. Having the Transmission lamp turn OFF will extend the time before lamp replacement. The lamp will turn back ON after any key is pressed, the Read button is pressed, or any "M, P, U, or Y" RCI command has taken place. LAMP ON causes the lamp to stay ON as long as the unit is powered on. LAMP OFF causes the lamp to turn OFF after two hours of non-use of the Transmission unit.

1. Depress [**FUNCTION**] and [**COLOR**] keys at the same time until "N Dcal Y" is displayed.
2. Depress [**FUNCTION**] for NO.
3. Depress [**FUNCTION**] for NO.
4. Depress [**ZERO**] for YES.
5. Depress [**FUNCTION**] three (3) times to advance to "**LAMP ON**".
6. Each depression of [**ZERO**] will alternate between LAMP OFF and LAMP ON.
7. Press [**FUNCTION**] one (1) time to return to normal operation.

Serial Interface

Interconnect and Definition

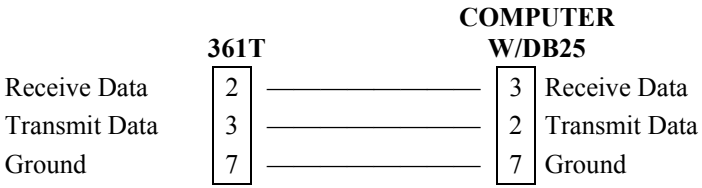
The 25-pin connector used for serial input/output is a DB25S type. Below is the connection diagram.



Pin #	Term Definition
2	Transmitted Data – Data transmitted from the densitometer with parameters (baud rate, format) set by the densitometer.
3	Received Data – Data received by the densitometer from outside source using the same parameters as the densitometer.
4	RTS (Request To Send) – Logic 0 only.
5	PIN 5 – if set to CTS = Logic 0 active, if set to BUSY = 1 active, and if set to OFF = IGNORE.
6	DSR (Data Set Ready) – Logic 0 active.
20	DTR (Data Terminal Ready) – Logic 0 active (On Line) and Logic 1 during: Power Off, Power Up, Self Test, during measurements, and when service RCI.

Note: Logic 1 = +.8VDC to –25VDC
Logic 0 = +2.25VDC to +25VDC

A typical interconnection (in its simplest form) between the 361T and a computer is shown below.



Serial Output

The data format that is transmitted from the 361T is determined by the I/O PORT options found in "I/O Port Selection" in Chapter 5.

> ***Serial Output Note* – Data transmitted by the 361T shall have one start bit (Logic 0), 7 bits of ASCII, one parity bit set to zero, and then one stop bit (Logic 1).**

Serial Input Commands

Your 361T is equipped with an input which allows the 361T to be controlled or monitored remotely. Every function which can be performed by the 361T (plus a few special functions not activated by the keyboard) can be activated via the serial input. This Remote Control Interface is covered by U.S. Patent 4,591,978.

Basically, the Remote Control Input (RCI) format consists of a series of characters (a command string) sent to the 361T in an ASCII FORMAT with a Carriage Return or Line Feed at the end of each command string to act as a delimiter. The 361T then acts on that command. The serial input buffer of the 361T, upon receiving its first command string character, sends a "Buffer Full" interrupt to the 361T microprocessor. The 361T microprocessor then halts all normal operation and dedicates itself to receiving and responding to remove control command strings. Normal execution is returned to upon receiving a GO command via the serial input.

> ***Serial Input Notes* – 1) Data transmitted by the 361T shall have one start bit (Logic 0), 7 bits of ASCII, one parity bit set to zero, and then one stop bit (Logic 1). 2) To ensure proper processing of received data by the 361T, a delay of 50 msec. should be added between every character sent to the 361T, and a delay of 500 msec. should be added after a "p", "t", or "u" command.**

Instruction Format

In general, the format used as the command string for serial input is as follows:

1	2	3	4
DATA —	ADDRESS —	ACTION CODE —	<LF>

1. DATA – is a two character hexadecimal code (in ASCII) which is written to the control register that is being addressed, and is used during a Write Action only.
2. ADDRESS – is a one to three character hexadecimal code (in ASCII) that selects the memory location which will be acted upon.
3. ACTION CODE – is a single character which is used to define the Remove Control Action as shown below:

NOTE: ALL ACTION CODES FOR THE 361T MUST BE SENT AS CAPITAL (UPPERCASE) LETTERS.

G **[Go]** is the ASCII character sent to the 361 to release it to operate as instructed after the "LF" (or "CR" is received.

NOTE: The reason for the "G" command is that when the 361T senses that data is being received on the serial input, it stops normal operation and only allows the serial input to modify or monitor keys and control registers, until a "G" Action Code is given to return the 361T to normal operation.

I **[INTERROGATE]** reads the external RAM memory from the first Address to the last Address, and sends the Data value(s) out the Transmit line of the I/O port in the following format: ##CR(LF). The first and last Address must both be designated a 3 hexadecimal characters in the command string. If the last Address is not sent or is a lower Address than the first Address, then only the first Address is read.

Command String ###### I——Action Code

Last Address First Address

J **[KEY ENABLE]** is used to enable or disable all keys (with the exception of the Read button) from altering the operation of the unit. This switch enables or disables the keys by the 361T receiving the following as the Address and Action Code portions of the string:

1J_____ Keys enabled

_____ 1 = keys enable
0 = keys disable

NOTE: This switch will reset itself to "keys enable" each time the unit is turned on by applying power or by executing a "P" command from RCI.

K **[KEY DEPRESSION]** is used to enable the 361T to transmit a K plus a number to indicate which key has been depressed. This switch is enabled or disabled by the 361T receiving the following as the Address and Action Code portion of the command string. The "KEYS ENABLED" switch (J) must be set to disable for the "K" code to function.

1K_____ Keys enabled

_____ 1 = keys enable
0 = keys disable

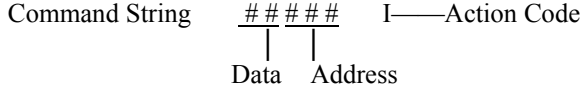
When enabled, the 361T will transmit the following when a key is pressed.

K1 = Function key
K2 = Color key
K3 = Zero key
K4 = Read button

In addition, a Carriage Return <CR> or a <CR> and a Line Feed <LF> will be sent after KX depending on how CR / CR LF is set in Modes.

NOTE: This switch will reset itself to KEY DEPRESSED DISABLE" each time the unit is turned on by applying power or by executing a "P" command for RCI.

L **[LOAD]** writes Data to the external RAM memory location Address. Data must be designated as 2 hexadecimal characters and the Address location as 3 hexadecimal characters, in the command string.

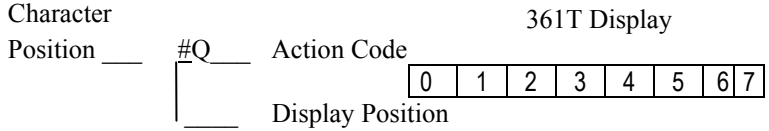


M **[MEASUREMENT]** causes the 361T to take a measurement.

N **[NULL]** causes a Reference measurement if either the Read button is pressed or if a measurement is being forced by use of the "M" Action Code.

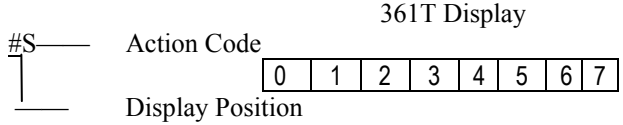
P **[POWER UP RESET]** causes the 361T to do a software reset.

Q **[QUERY]** transmits a single display character to the serial port, as designated by a single hexadecimal character (equal to the character position in the display) preceding the Action Code "Q".



R **[READ]** reads the Address location of the microprocessor's internal memory, and causes the 361T to serially output in ASCII Format 2 hexadecimal characters representing the binary data specified by the (2 hexadecimal characters) Address portion of the command string.

S **[STRING]** is used to display a string. The 361T will display whatever data it receives via the serial port, starting from the Display Address location, as designated by a single hexadecimal character preceding the action code "S".



T **[BAUD]** is used to change the baud rate of the 361T. The unit must receive the following as the address and the action codes portion of the command string:

XXT—— Action Code

03 = 300 baud
06 = 600 baud
0C = 1200 baud
18 = 2400 baud
30 = 4800 baud
60 = 9600 baud

After the 361T receives the first delimiter (#4 in the command string), it automatically performs a "g LF" (#5 and #6 in command string). The unit should not receive an additional "g<LF>".

A command string with a "T" as the action code with no address preceding it, sent to the 361T at the correct baud rate will force the 361T to transmit the proper hexadecimal code for its baud rate.

U **[UPDATE]** command must be received by the 361T after any write commands to internal or external RAM Memory and after any "Y" action codes. This command forces the unit to update the data written to RAM or process a "Y" action code and forces a position within a function as determined by an address preceding the "U" command. The 361T must receive the following as the address and action code portion of the command string.

1U—— Action Code

1 = forces display to data level

0 = forces display to beginning of function

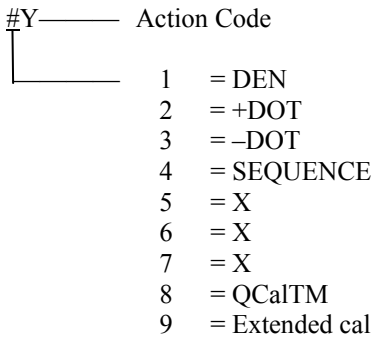
V **[VERSION]** transmits the software date code (that is displayed on the character displayed during power-up), and a <CR> or <CR><LF> to the serial port.

X-RITE 361 VER. XXXX (XXXX = Date Code)

W **[WRITE]** writes Data to the Address location of the microprocessor's internal RAM memory. This action causes the 361T to replace the contents of the microprocessor's RAM location, designated by the (2 hexadecimal characters) Address portion of the command string, with 8-bits of binary data, designed by the (2 hexadecimal characters) Data portion of the command string.

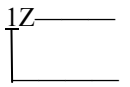
X **[TRANSMIT]** sends the present contents of the 361T display (8 characters) plus a <CR> or <CR><LF> to the serial port.

Y **[FUNCTION]** is used to select the function of the 361T. The unit must receive the following as the address and the action code portion of the string command.



A "U" command must also be received by the unit following a "Y" command.

Z **[DISPLAY ENABLE]** is used to enable or disable the display from being updated with data that occurs from normal operation. This switch enables or disables the display by the 361T receiving the following as the address and action code portion of the command string:



1 = display enable
0 = display disable

NOTE: This switch will reset itself to "Display enable" each time the unit is powered up by applying power or by executing a "P" command from RCI.

4 <LF> (Line Feed) is an ASCII Line Feed used as a delimiter and tells the 361T to perform the preceding command and unless that command was "G", wait for the next command. (Note: A <CR> can be sent instead of a <LF> if necessary.)

Internal RAM Data Addresses

The Internal RAM Data Addresses are used to access parameters not handled by action codes. The following list covers the most commonly used parameters, their addresses, and a bit map for each address. In addition, there are several notes that indicate the limitations and cautions that must be followed in using these addresses.

NAME	BIT #	FUNCTION
Mode (Address 2AH) Enabled when Bit = 1	0 1 2 3 4 5 6 7	Sequence Unlocked x10 Lamp 2 Hour Shut-off RCI on Seq. print format Bit 2 311 SEQ Color Lock Seq. print format Bit 1
Color (Address 2CH) Enable when Bit = 1	0 1 2 : 7	Ortho UV 0 : 0
I/O (Address 2E) X = Don't Care	0 1 2 3 4 5 6 7	Pin5: CTS = 1, BUSY = 0 Pin5: OFF = 1 DPT ON = 1 Baud Off = 1 CR LF = 1 COMP ON = 1 RPT ON = 1 HDR ON = 1

Seq. Print Format

	BIT 1	BIT 2
Seq. Each	1	X
Seq. Order	0	0
Seq. Class	0	1

External RAM Data Addresses

The External RAM Data Addresses are used to access data values, reference values, and other values. The following list covers the most commonly used addresses. In addition, there are several notes that caution the user and must be followed.

NAME	ADDRESS	DATA	PARAMETERS
*Memory Reset	0C8	1 Byte	Write a 00 to address plus a "P" command to reset system.

*USE THIS ADDRESS WITH CAUTION: Writing to this address will force system reset, and the unit will clear all memory locations. Calibration and data will be lost. Make sure that a system reset is what is desired.

	ORTHO	UV		
DEN Data	0C0,0C1	0C2,0C3	2 Bytes	Least significant bit
REF	0D0,0D1	0D2,0D3		(LSB) = .001D
+DOT Data	0E8,0E9	0EA,0EB		LSB = .1%
Ref	0F8,0F9	0FA,0FB		
-DOT Data*	118,119	11A,11B		LSB = .1%
Ref*	120m121	122m123		
*-DOT values are subtracted from 100% ex. Display = 99% -DOT Data = 1%				Values are in hexadecimal.

Sequence Functions				
				Sequence Function
Step 0,1	228	, 229	1 Byte	Step Zero = Byte
Step 2,3	22A	, 22B	1 Byte	80H=Skip
Step 4,5	22C	, 22D	1 Byte	81H=Zero
Step 6,7	22E	, 22F	1 Byte	
Step 8,9	230	, 231	1 Byte	Sequence Function
Step 10,11	232	, 233	1 Byte	Step 1-36 = Byte
Step 12,13	234	, 235	1 Byte	80H=Skip
Step 14,15	236	, 237	1 Byte	81H=DEN
Step 16,17	238	, 239	1 Byte	84H=+DOT
Step 18,19	23A	, 23B	1 Byte	88H=-DOT
Step 20,21	23C	, 23D	1 Byte	
Step 22,23	23E	, 23F	1 Byte	
Step 24,25	240	, 241	1 Byte	
Step 26,27	242	, 243	1 Byte	
Step 28,29	244	, 245	1 Byte	
Step 30,31	246	, 247	1 Byte	
Step 32,33	248	, 249	1 Byte	

NAME	ADDRESS		DATA	PARAMETERS
Step 34,35	24A	, 24B	1 Byte	
Step 36,27	24C	, 24D		
Sequence				
Data	ORTHO	UV		
Step 0	250,251	252,253	2 Bytes	Values are in hexa-
Step 1	254,255	256,257	2 Bytes	decimal. Least
Step 2	258,259	25A,25B	2 Bytes	significant bit =
Step 3	25C,25D	25E,25F	2 Bytes	.001D or 1%
Step 4	260,261	262,263	2 Bytes	
Step 5	264,265	266,267	2 Bytes	
Step 6	268,269	26A,26B	2 Bytes	
Step 7	26C,26D	26E,26B	2 Bytes	
Step 8	270,271	272,273	2 Bytes	
Step 9	274,275	276,277	2 Bytes	
Step 10	278,279	27A,27B	2 Bytes	
Step 11	27C,27D	27E,27F	2 Bytes	
Step 12	280,281	282,283	2 Bytes	
Step 13	284,285	286,287	2 Bytes	
Step 14	288,289	28A,28B	2 Bytes	
Step 15	28C,28D	28E,28F	2 Bytes	
Step 16	290,291	292,293	2 Bytes	
Step 17	294,295	296,297	2 Bytes	
Step 18	298,299	29A,29B	2 Bytes	
Step 19	29C,29D	29E,29F	2 Bytes	
Step 20	2A0,2A1	2A2,2A3	2 Bytes	
Step 21	2A4,2A5	2A6,2A7	2 Bytes	
Step 22	2A8,2A9	2AA,2AB	2 Bytes	
Step 23	2AC,2AD	2AE,2AF	2 Bytes	
Step 24	2B0,2B1	2B2,2B3	2 Bytes	
Step 25	2B4,2B5	2B6,2B7	2 Bytes	
Step 26	2B8,2B9	2BA,2BB	2 Bytes	
Step 27	2BC,2BD	2BE,2BF	2 Bytes	
Step 28	2C0,2C1	2C2,2C3	2 Bytes	
Step 29	2C4,2C5	2C6,2C7	2 Bytes	
Step 30	2C8,2C9	2CA,2CB	2 Bytes	
Step 31	2CC,2CD	2CE,2CF	2 Bytes	
Step 32	2D0,2D1	2D2,2D3	2 Bytes	
Step 33	2D4,2D5	2D6,2D7	2 Bytes	
Step 34	2D8,2D9	2DA,2DB	2 Bytes	
Step 35	2DC,2DD	2DE,2DF	2 Bytes	
Step 36	2E0,2E1	2E2,2E3	2 Bytes	

NAME	ADDRESS	DATA	PARAMETERS
CAL HI			
ORTHO	05A , 05B	2 Bytes	
UV	066 , 067	2 Bytes	
SKIP PROMPTS	700	1 Byte	Write 80 for skip prompts. Write 00 for prompts (default)

Maintenance

General

The X-Rite 361T is covered by a one-year limited warranty (excluding lamps) and should be referred to the factory or authorized service center for repair within the warranty period. Attempts to make repairs within this time frame may void the warranty.

Always verify instrument calibration to assure proper instrument operation. Make sure all connections are properly made.

X-Rite provides a factory repair service to their customers. Because of the complexity of the circuitry all circuitry repairs should be referred to the factory or an authorized service center.

X-Rite will repair any 361T past warranty. Shipping costs to the factory or authorized service shall be paid by the customer and the instrument shall be submitted in its original carton, as a complete unaltered unit.

AS A ROUTINE MAINTENANCE PROCEDURE, replace the read lamp after every 1200 hours of operation. This allows approximately a half year of operation (based on an 8 hour operating shift per five days a week). Failure to do so may cause erroneous density readings. X-Rite has also provided you with an extra Transmission read lamp. This lamp should only be replaced by a qualified service repair person.

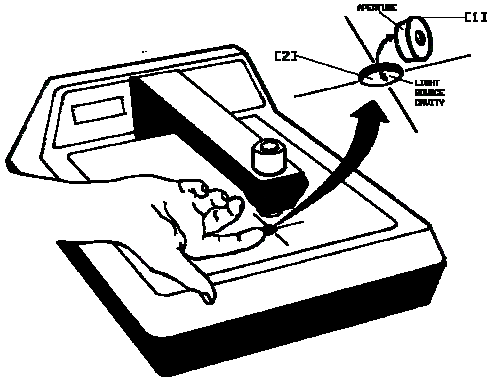
Exterior Cleaning

Never use any liquids (water or solvents) to clean the exterior of the instrument. Whenever required, the exterior of the instrument can be wiped clean with a dry, lint-free cloth.

Aperture Replacement & Cleaning

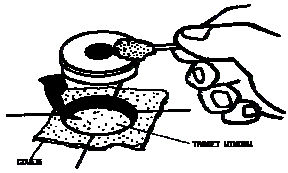
APERTURE REPLACEMENT

1. Remove aperture **[1]** by wedging edge of aperture upwards with fingernail.
2. To reinstall aperture, insert aperture into target opening **[2]** making sure aperture is pressed flush against surface.



APERTURE CLEANING

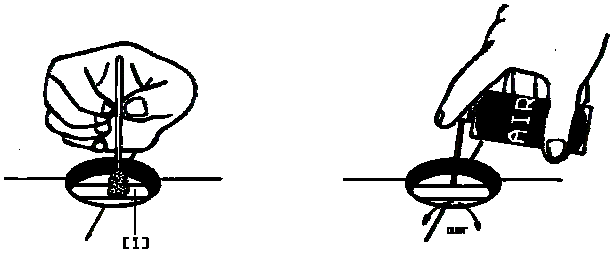
1. Remove aperture as described above.
2. Clean aperture with Q-tip moistened with alcohol.
3. Reinstall aperture.



NOTE: When cleaning the aperture always cover the target opening.

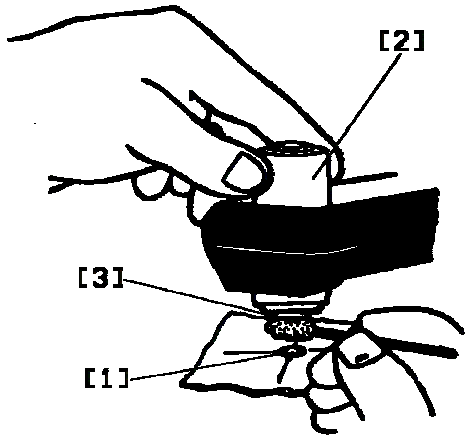
Beam Splitter Cleaning

1. Remove aperture as described in "Exterior Cleaning".
2. Clean residue from Beam Splitter **[1]** with dry Q-Tip.
3. Remove dust and lint by lightly blowing air into target opening.



Optics Cleaning

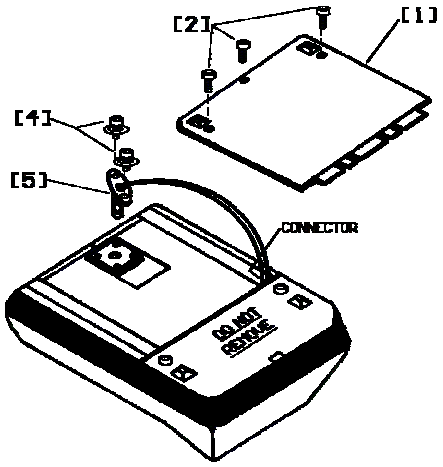
1. Cover aperture **[1]** with small piece of plastic.
2. Grasp reading head assembly **[2]** and lift upwards.
3. Clean residue and dust from optics **[3]** with Q-tip slightly moistened with alcohol.



Lamp Replacement

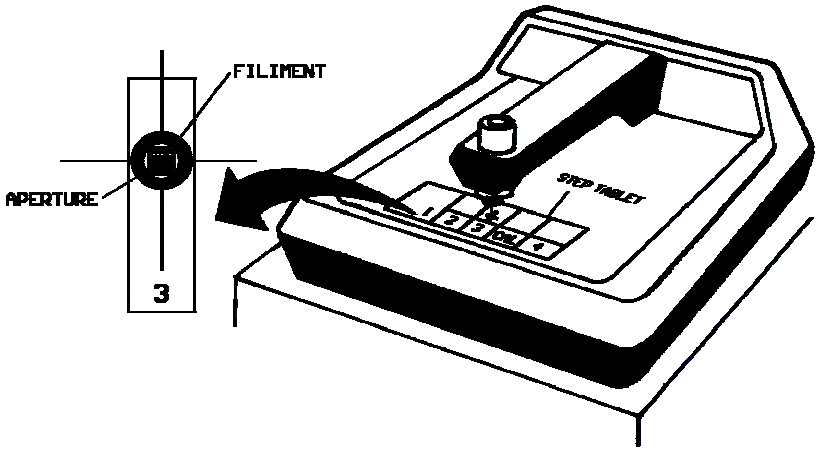
AS A ROUTINE MAINTENANCE PROCEDURE, replace the read lamp after every 1200 hours of operation. This allows approximately a half year of operation (based on an 8 hour operating shift per five days a week). Failure to do so may cause erroneous density readings. X-Rite has also provided you with an extra Transmission read lamp. This lamp should only be replaced by a qualified service repair person.

1. *DISCONNECT LINE CORD FROM POWER RECEPTACLE.*
2. Set unit upside down and remove larger bottom cover **[1]** by unscrewing the three screws **[2]** located in front portion of cover.
3. Unplug lamp connector from circuit board (located under small bottom cover).
4. Remove lamp assembly by unscrewing the two Phillips-head screws **[4]** (with washers) from bottom of lamp assembly then discard lamp assembly **[5]**.
5. Fasten new lamp assembly **[5]** in place with two Phillips- head screws **[4]**, and two flat washers supplied with lamp.
6. Plug lamp connector into circuit board.
7. Check lamp alignment. (See following page.)



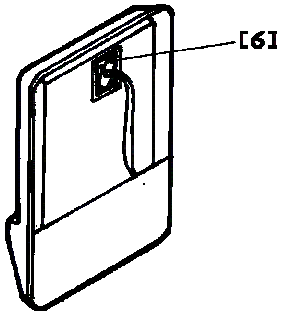
ALIGNMENT CHECK

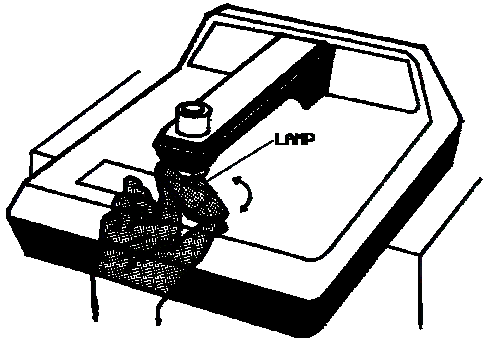
8. Set unit upright, plug line cord into wall receptacle, and turn power switch to "ON" position.
9. Locate your transmission reference (used for calibration) and center step "3" or "CAL" over aperture. (Use 3mm aperture.)
10. Look at the light coming through the round aperture. The lamp's filament will appear as a square in the middle of the aperture.
11. If lamp is properly aligned: Unplug line cord, turn unit upside down, and then fasten bottom cover in place with three screws removed in step 2. If lamp is not properly aligned, proceed with Steps 12 thru 16.



ALIGNMENT CHECK (continued)

12. Unplug line cord then loosen two Phillips-head screws 6 in bottom of lamp assembly.
13. Set front half of unit over edge of table, then plug line cord into wall receptacle.
14. Carefully move lamp assembly until lamp filament is centered with aperture (see Steps 9 and 10).
15. After alignment, unplug line cord and tighten two Phillips-head screws **[6]** in bottom of lamp assembly WITHOUT moving lamp assembly out of alignment.
16. Fasten bottom plate in position with three screws removed in Step 2.

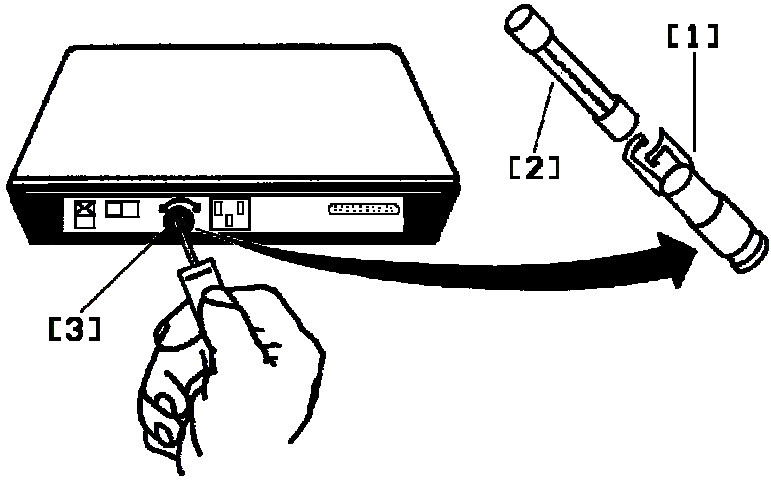




Fuse Replacement

[DISCONNECT LINE CORD BEFORE SERVICING]

1. Insert flatblade screwdriver into slot of fuse cap **[1]**.
2. Push in and turn counterclockwise one-half turn until fuse **[2]** and fuse cap pop out.
3. Remove fuse from fuse cap and replace with same type fuse.
   - 115vac operation (600ma 250v 3AG Slo-blo, P/N SE24-0060)
   - 230vac operation (300ma 250v Type T Time Lag, P/N SE49-00300)
4. Insert fuse into fuse cap, insert fuse into fuseholder **[3]**, push-in and turn clockwise one-half turn until fuse cap locks.



Appendix

Technical Specifications

PARAMETER	SPECIFICATION
Display	8 character LCD, 9.4mm H w/ EL backlighting
Measuring Range	
Density	0 - 6.0D
% DOT Area	0 - 100% (pos & neg)
Reference Range	
All Except DOT	All possible values measured
+DOT (Fringe)	-10% to +69%
-DOT (Fringe)	+31% to +110%
Calibration	Digital w/ lithium battery backup
Zero	Auto
Slope	Yes, for Density
Dot	For 50% Point
Accuracy	
Ortho, Visual	
2,3mm aperture	±0.02D (0-5.0D), ±1% (5.0-5.5D), ±2% (5.5-6.0D)
1mm aperture	±.02D (0-4.5D), ±1% (4.5-5.0D)
U.V.	
3mm aperture	±0.02D (0-3.5D), ±1% (3.5-4.0D)
Repeatability	
Ortho, Visual	
2,3mm aperture	±0.01D (0-5.0D), ±2% (5.0-5.5D), ±3% (5.5-6.0D)
1mm aperture	±.01D (0-4.5D), ±1% (4.5-5.0D)
U.V.	
3mm aperture	±0.01D (0-3.5D), ±1% (3.5-4.0D)
Interinstrument Agreement	±.02D, ±2% (0-5.0D)
Zero Stability	±.02D max per 8hr
Slope Stability	±1% max per 1 year
Warm-up Time	2 min. (U.V. = 5 min.)
Measuring Geometry	Per ANSI PH2.19, ISO5/2
Illumination	0 degrees
Light Collection	Diffusing surface
Aperture Angle	
Incident Light	Approx. ±5 degrees
Measuring Area Diameter	1, 2, 3mm .5mm optional, P/N 319-40-005

PARAMETER	SPECIFICATION
Response	
Orthochromatic	X-RITE Ortho
Ultraviolet	X-RITE U.V.
Visual (optional)	X-RITE Visual
Color Temp. of Light Source	Approx. 2850K
IR Sensitivity	D > 4.0 (U.V.)
Ambient Interference	D decreases <.25%
Interface	Bidirectional, Serial RS-232-C DTE
Baud Rate	300, 600, 1200, 2400, 4800, 9600
Voltage Requirements	T 90-130VAC, 50-60Hz TX 180-260VAC, 50-60Hz
Power Requirements	80VA max
Operating Relative Humidity	≤76%
Operating Temp. Range	+10º to +40ºC (+50º to +104ºF)
Storage Temp Range	-20º to +50ºC (-4º to +122ºF)
Dimensions (HxWxD)	[cm] 15.2 x 33. x 43.5 [in] 6. x 13.1 x 17.1
Gross Weight	[kg] 8.64 [lb] 19.0
Net Weight	[kg] 7.95 [lb] 17.5
Safety	UL 3101-01 C22.2, No. 1010-1-92
Altitude	2000m
IEC 664	Pollution Degree 2
Installation Type	Category 2
Usage	Indoor only
FCC	Part 15, Class A, Digital Device
Industry Canada	ICES-003 Issue 2, Revision 1
International	EN50081-1:1992 Class B Generic Emission Standard EN50082-1:1992 Generic Immunity Standard

Specifications and design appearance subject to change without notice.

Optional Equipment

There are six models of the 361 Reflection Head that are available to interface with the 361T Transmission unit.

Model 361G-06	Color Reflection Densitometer w/ G and T Response, 3.4mm Aperture
Model 361GS-06	Color Reflection Densitometer w/ G and T Response, 1.7mm Aperture
Model 361G/LP-06	Color Reflection Densitometer w/ G and T Response, 3.4mm Aperture, & Polarizing Filter
Model 361E-06	Color Reflection Densitometer w/ E and N Response, 3.4mm Aperture
Model 361ES-06	Color Reflection Densitometer w/ E and N Response, 1.7mm Aperture
Model 361E/LP-06	Color Reflection Densitometer w/ E and N Response, 3.4mm Aperture, & Polarizing Filter

NOTE: The Reflection Heads listed come with all necessary cables, instructions, and accessories to connect to the 361T.

G - represents the normal X-Rite Graphics Arts wideband response. It is similar to Status T response but has more sensitivity to denser yellow inks.

T - represents ANSI Status T Computerized Color Response™ (CCRTM), for use with the *T-Ref color reference.

E - represents a European response which uses a 47B filter for yellow.

N - represents Narrow Band Glass Interference Type Computerized Color ResponseTM. This response is computer corrected and designed for use with process inks on paper. Measurements other than process inks may yield answers with slight discrepancies.

* T-Ref is a trademark of GCA (Graphic Communication Association).

Interface Cables available:

P/N 361-69 Transmission/Reflection Interface Cable

P/N 361-83 DB25P to 10 Circuit Modular Interface Cable
(Available Adaptors for 361-83 cable above)

P/N 418-70 DB25P DCE (Null Modem) Interface Adaptor

P/N 418-71 DB25S DCE (Null Modem) Interface Adaptor

P/N 418-80 DB25P DTE (Normal) Interface Adaptor

P/N 418-81 DB25S DTE (Normal) Interface Adaptor

P/N 418-90 DB9P Interface Adaptor

P/N 418-91 DB9S Interface Adaptor

P/N 309-149 Whisper Printer Interface Cable

P/N 309-249 Seiko Printer Interface Cable

Optics Assemblies available:

P/N 361V-23 Visual/U.V. Optics Assembly

Corporate Headquarters - USA
4300 44th Street SE
Grand Rapids, Michigan 49512
Phone 1 800 248 9748 or 1 616 803 2100
Fax 1 800 292 4437 or 1 616 803 2705

Corporate Headquarters - Europe
Althardstrasse 70
8105 Regensdorf
Switzerland
Phone (+41) 44 842 24 00
Fax (+41) 44 842 22 22

Corporate Headquarters - Asia
Room 808-810
Kornhill Metro Tower, 1 Kornhill Road
Quarry Bay, Hong Kong
Phone (+852) 2 568 6283
Fax (+852) 2 885 8610

Please visit www.xrite.com for a local office near you.

P/N 361T-500 Rev. JJ